

$f_2(1565)$

$I^G(J^{PC}) = 0^+(2^{++})$

OMITTED FROM SUMMARY TABLE

Seen mostly in antinucleon-nucleon annihilation. Needs confirmation in other channels.

NODE=M123

NODE=M123

NODE=M123M

NODE=M123M

$f_2(1565)$ MASS

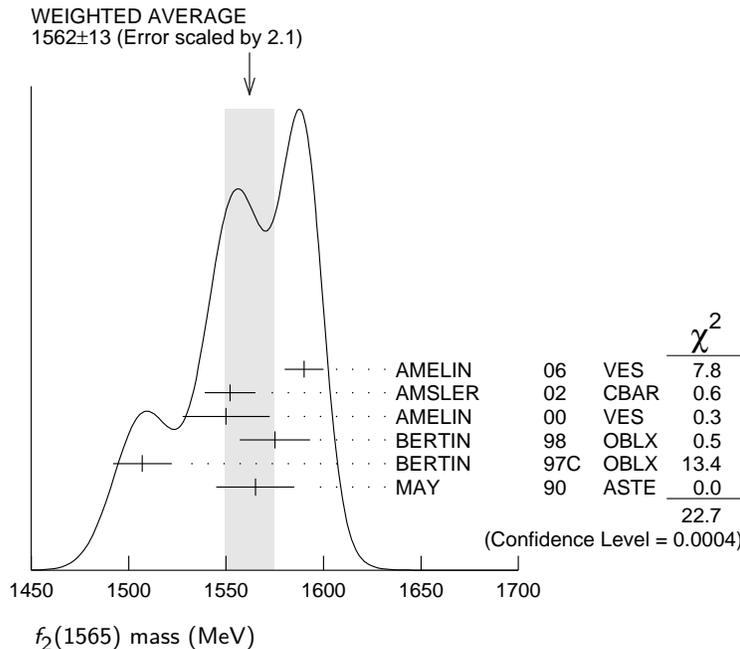
VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
1562±13 OUR AVERAGE	Error includes scale factor of 2.1. See the ideogram below.		
1590±10	1 AMELIN	06 VES	36 $\pi^- p \rightarrow \omega \omega n$
1552±13	2 AMSLER	02 CBAR	0.9 $\bar{p} p \rightarrow \pi^0 \eta \eta, \pi^0 \pi^0 \pi^0$
1550±10±20	AMELIN	00 VES	37 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$
1575±18	BERTIN	98 OBLX	0.05-0.405 $\bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
1507±15	2 BERTIN	97C OBLX	0.0 $\bar{p} p \rightarrow \pi^+ \pi^- \pi^0$
1565±20	MAY	90 ASTE	0.0 $\bar{p} p \rightarrow \pi^+ \pi^- \pi^0$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1560±15	3 ANISOVICH	09 RVUE	0.0 $\bar{p} p, \pi N$
1598±11± 9	BAKER	99B SPEC	0 $\bar{p} p \rightarrow \omega \omega \pi^0$
1534±20	4 ABELE	96C RVUE	Compilation
~ 1552	5 AMSLER	95D CBAR	0.0 $\bar{p} p \rightarrow \pi^0 \pi^0 \pi^0, \pi^0 \eta \eta, \pi^0 \pi^0 \eta$
1598±72	BALOSHIN	95 SPEC	40 $\pi^- C \rightarrow K_S^0 K_S^0 X$
1566 ⁺⁸⁰ ₋₅₀	6 ANISOVICH	94 CBAR	0.0 $\bar{p} p \rightarrow 3\pi^0, \eta \eta \pi^0$
1502± 9	ADAMO	93 OBLX	$\bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
1488±10	7 ARMSTRONG	93C E760	$\bar{p} p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$
1508±10	7 ARMSTRONG	93D E760	$\bar{p} p \rightarrow 3\pi^0 \rightarrow 6\gamma$
1525±10	7 ARMSTRONG	93D E760	$\bar{p} p \rightarrow \eta \pi^0 \pi^0 \rightarrow 6\gamma$
~ 1504	8 WEIDENAUER	93 ASTE	0.0 $\bar{p} N \rightarrow 3\pi^- 2\pi^+$
1540±15	7 ADAMO	92 OBLX	$\bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
1515±10	9 AKER	91 CBAR	0.0 $\bar{p} p \rightarrow 3\pi^0$
1477± 5	BRIDGES	86C DBC	0.0 $\bar{p} N \rightarrow 3\pi^- 2\pi^+$

OCCUR=2

NODE=M123M;LINKAGE=AM
 NODE=M123M;LINKAGE=G
 NODE=M123M;LINKAGE=AN
 NODE=M123M;LINKAGE=AA
 NODE=M123M;LINKAGE=AB
 NODE=M123M;LINKAGE=C

NODE=M123M;LINKAGE=E
 NODE=M123M;LINKAGE=F
 NODE=M123M;LINKAGE=BA

- 1 Supersedes the $\omega \omega$ state of BELADIDZE 92B earlier assigned to the $f_2(1640)$.
- 2 T-matrix pole.
- 3 On sheet II in a two-pole solution.
- 4 T-matrix pole, large coupling to $\rho \rho$ and $\omega \omega$, could be $f_2(1640)$.
- 5 Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.
- 6 From a simultaneous analysis of the annihilations $\bar{p} p \rightarrow 3\pi^0, \pi^0 \eta \eta$ including AKER 91 data.
- 7 J^P not determined, could be partly $f_0(1500)$.
- 8 J^P not determined.
- 9 Superseded by AMSLER 95B.



$f_2(1565)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
134± 8 OUR AVERAGE			
140± 11	¹⁰ AMELIN	06 VES	$36 \pi^- p \rightarrow \omega \omega n$
113± 23	¹¹ AMSLER	02 CBAR	$0.9 \bar{p} p \rightarrow \pi^0 \eta \eta, \pi^0 \pi^0 \pi^0$
130± 20±40	AMELIN	00 VES	$37 \pi^- p \rightarrow \eta \pi^+ \pi^- n$
119± 24	BERTIN	98 OBLX	$0.05-0.405 \bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
130± 20	¹¹ BERTIN	97C OBLX	$0.0 \bar{p} p \rightarrow \pi^+ \pi^- \pi^0$
170± 40	MAY	90 ASTE	$0.0 \bar{p} p \rightarrow \pi^+ \pi^- \pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
280± 40	¹² ANISOVICH	09 RVUE	$0.0 \bar{p} p, \pi N$
180± 60	¹³ ABELE	96C RVUE	Compilation
~ 142	¹⁴ AMSLER	95D CBAR	$0.0 \bar{p} p \rightarrow \pi^0 \pi^0 \pi^0, \pi^0 \eta \eta, \pi^0 \pi^0 \eta$
263±101	BALOSHIN	95 SPEC	$40 \pi^- C \rightarrow K_S^0 K_S^0 X$
166 ⁺ ₋₂₀	¹⁵ ANISOVICH	94 CBAR	$0.0 \bar{p} p \rightarrow 3\pi^0, \eta \eta \pi^0$
130± 10	¹⁶ ADAMO	93 OBLX	$\bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
148± 27	¹⁷ ARMSTRONG	93C E760	$\bar{p} p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$
103± 15	¹⁷ ARMSTRONG	93D E760	$\bar{p} p \rightarrow 3\pi^0 \rightarrow 6\gamma$
111± 10	¹⁷ ARMSTRONG	93D E760	$\bar{p} p \rightarrow \eta \pi^0 \pi^0 \rightarrow 6\gamma$
~ 206	¹⁸ WEIDENAUER	93 ASTE	$0.0 \bar{p} N \rightarrow 3\pi^- 2\pi^+$
132± 37	¹⁷ ADAMO	92 OBLX	$\bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
120± 10	¹⁹ AKER	91 CBAR	$0.0 \bar{p} p \rightarrow 3\pi^0$
116± 9	BRIDGES	86C DBC	$0.0 \bar{p} N \rightarrow 3\pi^- 2\pi^+$
¹⁰ Supersedes the $\omega \omega$ state of BELADIDZE 92B earlier assigned to the $f_2(1640)$.			
¹¹ T-matrix pole.			
¹² On sheet II in a two-pole solution.			
¹³ T-matrix pole, large coupling to $\rho \rho$ and $\omega \omega$, could be $f_2(1640)$.			
¹⁴ Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.			
¹⁵ From a simultaneous analysis of the annihilations $\bar{p} p \rightarrow 3\pi^0, \pi^0 \eta \eta$ including AKER 91 data.			
¹⁶ Supersedes ADAMO 92.			
¹⁷ J^P not determined, could be partly $f_0(1500)$.			
¹⁸ J^P not determined.			
¹⁹ Superseded by AMSLER 95B.			

NODE=M123W

NODE=M123W

OCCUR=2

NODE=M123W;LINKAGE=AM
 NODE=M123W;LINKAGE=G
 NODE=M123W;LINKAGE=AN
 NODE=M123W;LINKAGE=CC
 NODE=M123W;LINKAGE=AB
 NODE=M123W;LINKAGE=D

NODE=M123W;LINKAGE=C
 NODE=M123W;LINKAGE=E
 NODE=M123W;LINKAGE=F
 NODE=M123W;LINKAGE=BA

 $f_2(1565)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\pi \pi$	seen
Γ_2 $\pi^+ \pi^-$	seen
Γ_3 $\pi^0 \pi^0$	seen
Γ_4 $\rho^0 \rho^0$	seen
Γ_5 $2\pi^+ 2\pi^-$	seen
Γ_6 $\eta \eta$	seen
Γ_7 $a_2(1320) \pi$	
Γ_8 $\omega \omega$	seen
Γ_9 $K \bar{K}$	
Γ_{10} $\gamma \gamma$	

NODE=M123215;NODE=M123

DESIG=6;OUR EST;→ UNCHECKED ←
 DESIG=1;OUR EST;→ UNCHECKED ←
 DESIG=3;OUR EST;→ UNCHECKED ←
 DESIG=2;OUR EST;→ UNCHECKED ←
 DESIG=5;OUR EST;→ UNCHECKED ←
 DESIG=4;OUR EST;→ UNCHECKED ←
 DESIG=8
 DESIG=7;OUR EST;→ UNCHECKED ←
 DESIG=9
 DESIG=10

 $f_2(1565)$ PARTIAL WIDTHS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.2±0.3	870	²⁰ SCHEGELSKY 06A	RVUE	$\gamma \gamma \rightarrow K_S^0 K_S^0$	Γ_6
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.0±1.0	870	²⁰ SCHEGELSKY 06A	RVUE	$\gamma \gamma \rightarrow K_S^0 K_S^0$	Γ_9

NODE=M123225

NODE=M123W3
 NODE=M123W3

NODE=M123W1
 NODE=M123W1

$\Gamma(\gamma\gamma)$ Γ_{10}

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.70±0.14	870	²⁰ SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$
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²⁰ From analysis of L3 data at 91 and 183–209 GeV, using $f_2(1565)$ mass of 1570 MeV, width of 160 MeV, $\Gamma(\pi\pi) = 25$ MeV, and SU(3) relations.

NODE=M123W2
NODE=M123W2

NODE=M123W1;LINKAGE=SC

 $f_2(1565)$ BRANCHING RATIOS

NODE=M123220

 $\Gamma(\pi\pi)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

seen	BAKER	99B	SPEC	$0 \bar{p}p \rightarrow \omega\omega\pi^0$
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NODE=M123R5
NODE=M123R5

 $\Gamma(\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

seen	BERTIN	98	OBLX	$0.05-0.405 \bar{p}p \rightarrow \pi^+\pi^+\pi^-$
not seen	²¹ ANISOVICH	94B	RVUE	$\bar{p}p \rightarrow \pi^+\pi^-\pi^0$
seen	MAY	89	ASTE	$\bar{p}p \rightarrow \pi^+\pi^-\pi^0$

NODE=M123R1
NODE=M123R1

²¹ ANISOVICH 94B is from a reanalysis of MAY 90.

NODE=M123R1;LINKAGE=A

 $\Gamma(\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	AMSLER	95B	CBAR	$0.0 \bar{p}p \rightarrow 3\pi^0$
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NODE=M123R3
NODE=M123R3

 $\Gamma(\pi^+\pi^-)/\Gamma(\rho^0\rho^0)$ Γ_2/Γ_4

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.042±0.013	BRIDGES	86B	DBC	$\bar{p}N \rightarrow 3\pi^- 2\pi^+$
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NODE=M123R2
NODE=M123R2

 $\Gamma(\eta\eta)/\Gamma(\pi^0\pi^0)$ Γ_6/Γ_3

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.024±0.005±0.012	²² ARMSTRONG	93C	E760	$\bar{p}p \rightarrow \pi^0\eta\eta \rightarrow 6\gamma$
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²² J^P not determined, could be partly $f_0(1500)$.

NODE=M123R4
NODE=M123R4

NODE=M123R4;LINKAGE=E

 $\Gamma(\omega\omega)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

seen	BAKER	99B	SPEC	$0 \bar{p}p \rightarrow \omega\omega\pi^0$
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NODE=M123R6
NODE=M123R6

 $f_2(1565)$ REFERENCES

NODE=M123

ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	
AMELIN	06	PAN 69 690	D.V. Amelin <i>et al.</i>	(VES Collab.)
SCHEGELSKY	06A	EPJ A27 207	V.A. Schegelsky <i>et al.</i>	
AMSLER	02	EPJ C23 29	C. Amsler <i>et al.</i>	
AMELIN	00	NP A668 83	D. Amelin <i>et al.</i>	(VES Collab.)
BAKER	99B	PL B467 147	C.A. Baker <i>et al.</i>	
BERTIN	98	PR D57 55	A. Bertin <i>et al.</i>	(OBELIX Collab.)
BERTIN	97C	PL B408 476	A. Bertin <i>et al.</i>	(OBELIX Collab.)
ABELE	96C	NP A609 562	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95B	PL B342 433	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95C	PL B353 571	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95D	PL B355 425	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
BALOSHIN	95	PAN 58 46	O.N. Baloshin <i>et al.</i>	(ITEP)
AMSLER	94D	PL B333 277	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
ANISOVICH	94	PL B323 233	V.V. Anisovich <i>et al.</i>	(Crystal Barrel Collab.)
ANISOVICH	94B	PR D50 1972	V.V. Anisovich <i>et al.</i>	(LOQM)
ADAMO	93	NP A558 13C	A. Adamo <i>et al.</i>	(OBELIX Collab.)
ARMSTRONG	93C	PL B307 394	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
ARMSTRONG	93D	PL B307 399	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
WEIDENAUER	93	ZPHY C59 387	P. Weidenauer <i>et al.</i>	(ASTERIX Collab.)
ADAMO	92	PL B287 368	A. Adamo <i>et al.</i>	(OBELIX Collab.)
BELADIDZE	92B	ZPHY C54 367	G.M. Beladidze <i>et al.</i>	(VES Collab.)
AKER	91	PL B260 249	E. Aker <i>et al.</i>	(Crystal Barrel Collab.)
MAY	90	ZPHY C46 203	B. May <i>et al.</i>	(ASTERIX Collab.)
MAY	89	PL B225 450	B. May <i>et al.</i>	(ASTERIX Collab.) IJP
BRIDGES	86B	PRL 56 215	D.L. Bridges <i>et al.</i>	(SYRA, CASE)
BRIDGES	86C	PRL 57 1534	D.L. Bridges <i>et al.</i>	(SYRA)

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